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LUMINESCENCE ANALYSIS

M. A. Konstantinova-Shlezinger

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FOREWORD

During the past 10 years, specialists of the most diverse fields of science and technology have been turning to the method of luminescence analysis for solving practical costly problems. Luminescence analysis is employed with great success in discovering natural bitumens, asphalts, oils, tungsten, uranium, and various minerals. With the aid of this method, the engineer in machine construction can foresee defects in metals and other details. The biologist uses luminescence analysis for determining the composition and contents of substances of interest to him, such as vitamins and porphyrins. The clinicist uses it to diagnose diseases.

In spite of such wide and varied application, luminescence analysis up to now has not been well organized. Its various methods have not been systematized and have not been based upon physical and chemical theory. As a result, the author has had to observe many times how the first slow and difficult steps of specialists, turning to luminescence analysis to solve this or that practical problem, have in many cases faltered and failed and how, because of the absence of aids explaining the capacity of this form of analysis, their work remained ineffectural.

Foreign books on luminescence analysis do not solve this problem. Some of them, for example, Lankvort's book, give a summary or list of cases of application of luminescence analysis to various areas of practical work and seem to be useful handbooks or references for those who already have firm possession of the method; however, they do not in any way provide a helpful guide in the new field of luminescence analysis. Other books, such as Heitinger's and Dere's give a clear and firm theoretical description of the methods of luminescence analysis, but only applicable to separate areas in science, as is obvious from the titles and descriptions of these books. Luminescence analysis as a whole stands outside the compass of their interests.

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In a textbook on luminescence analysis, each of the numerous works concerning its application must find its place in an outline of usable methodology, without being dependent upon the person by whom analysis is realized, such as the clinicist, geologist, or technician.

During systematization of the methods according to such a principle, luminescence analysis naturally is broken up into chemical fluorescence analysis and int. luminescence analysis which does not touch upon the problems of chemistry. The author conditionally calls the latter "sort-analysis." The specific of these two types of analysis and the character of the problems solvable by them are considerably different. The applicable methods of analysis are united by the author into five types of five methods; for each of these there is given separately a description, fundamental facts according to the physical and chemical theory and the selection of possible application. In Chapters XII and XVI there are discussed the problems which are solved by the aid of these five methods in the different fields of science and technology.

During the formation of a textbook on luminescence analysis which has possibly satisfied the above-mentioned requirements, it is necessary to state in detail the problems relating to the various fields of science and technology. In particular, it is necessary to sum up and to generalize critically the articles, scattered in different specialized journals, on the application of luminescence analysis. Inasmuch as one aspect of the theory cannot be applied to different fields, generalization must be conducted by "polishing" some inaccuracy of the statements in a treatise on the application of luminescence analysis to the soltuion of special problems. The present application in a given field is of prime importance since, at this time, it is the duty of everyone to speed up work by utilizing all the possibilities afforded to present-day science and technology.

The present work, of necessity, differs in one more particular: generally the tocks are intended for a definite circle of readers, whereas this guide on luminescence analysis must suit the interests of workers in various specialties. It must be profitable and accessible to those of varied education and possessing unequal theoretical preparation. This explains the obvious simplicity of exposition and style embodied here. The book was written on two bases, as it were: specialized data, and elementary information of a general nature.

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